

The effectiveness of measures to mitigate nitrate concentrations in surface and groundwater depends not only on their suitability for reducing nitrate leaching, but also on characteristics of groundwater transport that may cause a lag in achieving recovery. The recovery of a catchment within a Nitrate Vulnerable Zone in the east of Scotland has been assessed using a combined monitoring and modelling approach. Understanding of the dominant hydrological processes was developed through a programme of monitoring of surface and groundwater bodies. Age dating of groundwater samples, using dissolved atmospheric trace gases (CFCs and SF<sub>6</sub>) underpinned the conceptualisation of groundwater transport and a lumped dispersion model was applied to the data to estimate mean solute transit times. High spatial variability in the groundwater dating made it difficult to estimate catchment means, but the range was estimated to lie between 15 and 60 years. A catchment hydrology and nitrate model was used to explore the effect of simple changes in land management on reducing nitrate concentrations, as well as associated time scales of recovery. The study has helped improve understanding of the role of groundwater in catchment recovery and given an indication of the scale of agricultural changes required to achieve different levels of pollution mitigation.